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IOT PRISON BREAK MONITERING AND ALERTING SYSTEM

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ABSTRACT:

We have surveillance systems for protection of public places such as banks, shopping malls, homes, etc. from robbers, and other negative people. People are well acquainted with current security systems of the Indian jails. There are some system like CCTVs, drones and guards are used to monitor the activities of the jail, But as these security systems are not sufficient to monitor all such criminal activity and surely ensure that there is no such chance of the escaping of these prisoners from the prison. There are also many problems associated with the modern security systems, Some of them which are detected issues with these CCTVs are that: not having proper clear images at night, unsaturated camera footage, disturbing videos, visible horizontal lines on videos, no video signal is available sometime, recording system is not their by DVR, starting some false alarms with not proper cause, bright spots on the monitor, etc. By These troubles there are the situation that can be created in the jails where prisoner can get a chance to flee as well as can cause any unexpected activities inside the jail, also deployment of these techniques is quite costlier. Because of this all issue it shows that there is a demand of proper secure security system, that is under budget to use and can provide satisfactory surveillance security solution to the Indian jails also to the society. Many systems are introduced before have to fulfill this demand that generally use equipment such as Iot , Bluetooth, GSM, GPS but these systems are not steady and can be affected by cyber-attacks, which will be the issue of the safety. Now we cameup with this project with an idea to design an advanced and reliable , safe fix for this problem of this situation. Motive behind our device is to implement an safe and monitored environment in the prison that supervise the motion of the prisoners and the outsiders and overcome the problem present with the security modules available in the market previously.

I.INTRODUCTION

Project's main aim is detect movement or status of behavior of prisoner's inside prison , whether they are in the premise area or not ,or their any unusual activity is affecting safety of prison or not . For this purpose, Geofencing has been done and to fail the idea of escaping , laser is used . This Project is based on Prison Security and Safety devices that are made by using Wi-Fi, Bluetooth for Internet as communication mode, GPS and GSM for SMS as communication mode for communication between higher authority and prison alert system. They have particular restriction on each of them.

Wi-Fi and Bluetooth devices have a limited to transmit signal and communicate with each other. Also prison's are present at different - different location, like that of village area, or highly populated dense area, having multistory building that causes Poor internet connectivity which will decrease it's efficiency. Organization of the Project: While working on Project is the literature survey has been done to know about their pros and cons in the market. And further we have seen the functioning of these currently available system . After knowing the currently available system it will clarifies the points that should be examined to design an efficient setup, after which we will work on it.

Further we have known the Project and proposes a new problem statement based on the overlook of the currently used systems and gives the future aspects of the give project. As we know The prison system in India is not as good as we are known by our cinema, our by diplomatic debate related to politics .In the era of everything digitally present in our country India, we are so orthodox about our safety, that prison system are not updated, also no concern is shown at present time also about related to safety upgradation of prison . Because of this scenario of orthodox system, the jail breaks are

very common and most usual thing to happen in present era.

No such count documentation is present but prison escapes keep happen, either at large scale or in smaller scale, and no such is hyped in the era. This thought us is itself very scary, the prisoners are roaming about our society, it is dangerous too. For this status to overcome as we know we can rely more on machines for being perfectionist we should engage with ths system of safety both human and digital system, so as we have human power present so The changes required in the today's prison system is that, that the system should be a bit digitalized , by which it will be more safe and reliable system.

The digital system to be used can be made reliable that it can't be under cyber attack, as there are people who want to deform the government authority, and some want to support prisoner for there particular motive. There are some more aspects that can be used to make this system more reliable against cyber attack, which can be used to make it safe.

II. LITERATURE SURVEY

Arjun et al. [1] present a survey of wireless sensor networks for Border Surveillance and Intruder Detection. The aim is to devise a multi-sensing system which is developed by combining different techniques of surveillance and intruder detection, for varying border scenarios such as, flat surface movement or water-body movement. Different sensors for human intruder detection such as, geophone, hydrophone, infrared and surveillance cameras are discussed

Jisha et al. [2] propose a system for intruder detection which employs an object detection technique using Wireless sensor networks. PIR (Passive infrared) sensors are used which are further connected to MICAz sensor node. The proposed system is expected to detect and track the intruder and report its speed and direction of movement to a central base station for further processing

Singh and Khushwaha [3] propose a mechanism for smart border surveillance and automatic combat. It makes use of features extracted from optical flow information of the scene. Once the automatic detection of intruder takes place, suitable action is taken depending upon the relative position of the intruder with respect to the border fence. If the intruder happens to be behind the fence, mere tracking is followed. If the intruder is above the fence and trying to cross it, an alarm is raised. Auto-firing can be activated when the intruder has actually crossed the fence.

Jin et al. [4] present a method for detecting and classifying a target by using seismic and PIR sensors. The target can be classified into one of the three classes of vehicle, animal or human. A wavelet method called symbolic dynamic filtering (SDF) is used for feature extraction from the sensor signals. Zhang and Liang

Ye et al. [5] present a method to detect moving target via using the technique of background subtraction and shadow removal. The method is applied for RGB color space. Metrically trimmed mean and mean absolute deviation are the estimators used for background subtraction. The Chromacity difference and brightness difference are the estimators for shadow removal.

III.DESIGN OF HARDWARE

This chapter briefly explains about the Hardware. It discuss the circuit diagram of each module in detail.

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Uno

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board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Arduino board has the following new features:

- 1.0 pin out: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes.

- Stronger RESET circuit.

- Atmega 16U2 replace the 8U2.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

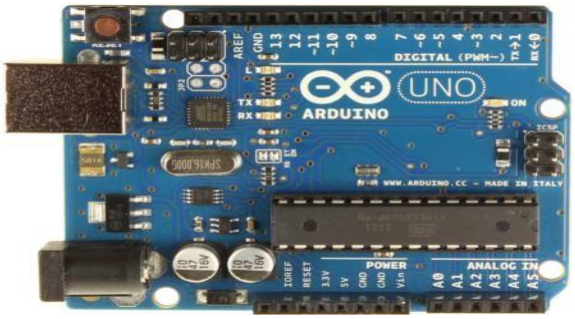

Fig: ARDUINO UNO

POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".

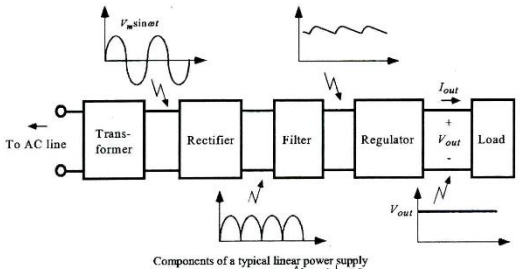

Fig: Block Diagram of Power Supply

LCD DISPLAY

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

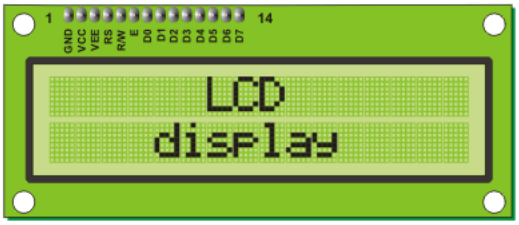

Fig: LCD

BUZZER

Digital systems and microcontroller pins lack sufficient current to drive the circuits like relays, buzzer circuits etc. While these circuits require around 10milli amps to be operated, the microcontroller's pin can provide a maximum of 1-2milli amps current. For this reason, a driver such as a power transistor is placed in between the microcontroller and the buzzer circuit.

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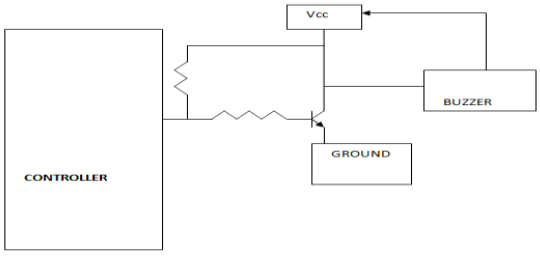

WIFI MODULE:

The **ESP8266** is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems.[1]

The chip first came to the attention of western makers in August 2014 with the **ESP-01** module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.[3]

The **ESP8285** is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.[4]

The successor to these microcontroller chips is the ESP32.

LED:

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.[5] When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LEDs are typically small (less than 1 mm^2) and integrated optical components may be used to shape the radiation pattern.

Early LEDs were often used as indicator lamps for electronic devices, replacing small incandescent bulbs. They were soon packaged into numeric readouts in the form of seven-segment displays and were commonly seen in digital clocks. Recent developments have produced LEDs suitable for environmental and task lighting. LEDs have led to new displays and sensors, while their high switching rates are useful in advanced communications technology.

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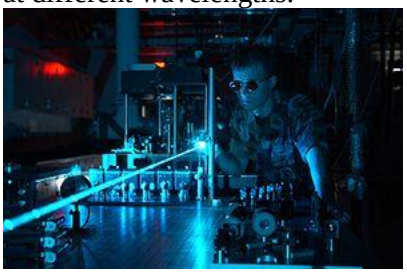
LEDs have many advantages over incandescent light sources, including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. Light-emitting diodes are used in applications as diverse as aviation lighting, automotive headlamps, advertising, general lighting, traffic signals, camera flashes, and lighted wallpaper. They are also significantly more energy efficient and, arguably, have fewer environmental concerns linked to their disposal.

LASER SENSOR

Light amplification by stimulated emission of radiation (LASER or laser) is a mechanism for emitting electromagnetic radiation, typically light or visible light, via the process of stimulated emission. The emitted laser light is (usually) a spatially coherent, narrow low-divergence beam, that can be manipulated with lenses. In laser technology, "coherent light" denotes a light source that produces (emits) light of in-step waves of identical frequency and phase. [1] The laser's beam of coherent light differentiates it from light sources that emit incoherent light beams, of random phase varying with time and position; whereas the laser light is a narrow-wavelength electromagnetic spectrum monochromatic light; yet, there are lasers that emit a broad spectrum light, or simultaneously, at different wavelengths.



Vibration Sensor

This module features an adjustable potentiometer, a vibration sensor, and a LM393 comparator chip to give an adjustable digital output based on the amount of vibration. The potentiometer can be adjusted to both increase and decrease the sensitivity to the desired

amount. The module outputs a logic level high (VCC) when it is triggered and a low (GND) **when it isn't. Additionally** there is an onboard LED that turns on when the module is triggered.

LIGHT DEPENDENT RESISTOR

A photo resistor or light dependent resistor (LDR) is a resistor whose resistance decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. It can also be referred to as a photoconductor or CdS device, from "cadmium sulfide," which is the material from which the device is made and that actually exhibits the variation in resistance with light level. Note that CdS is not a semiconductor in the usual sense of the word (not doped silicon).

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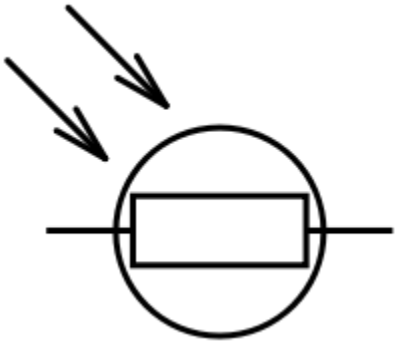
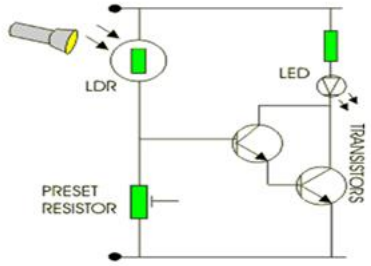


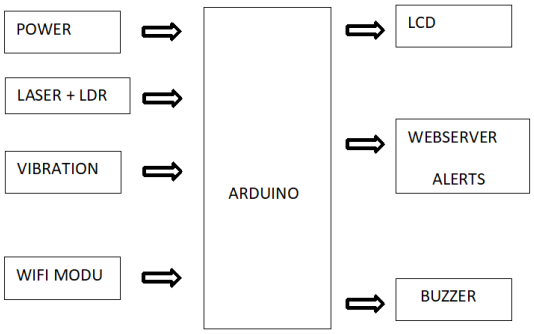
A photoresistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.

A photoelectric device can be either intrinsic or extrinsic. An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, e.g. silicon. In intrinsic devices the only available electrons are in the valence band, and hence the photon must have enough energy to excite the electron across the entire bandgap. Extrinsic devices have impurities, also called dopants, added whose ground state energy is closer to the conduction band; since the electrons do not have as far to jump, lower energy photons (i.e., longer wavelengths and lower frequencies) are sufficient to trigger the device. If a sample of silicon has some of its atoms replaced by phosphorus atoms (impurities), there will be extra electrons available for conduction. This is an example of an extrinsic semiconductor. Photo resistors are basically photocells.

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.



IV. BLOCK DIAGRAM:



Working: Discussion on Results of Light Source Approach In this configuration, the perimeter wall of the prison can be divided into numerous zones, each of which has a Laser module installed on one side and an LDR to detect laser beams on the other wall. The laser beam would be broken if the prisoner tried to

approach the wall, raising an alert by activating the siren and sending brief signals to the authorities. The circuit connection for connecting a laser sensor, LDR, and an Arduino Uno board is shown in Fig. . This circuit enables an alarm system (Siren/Buzzer) and processes the signals supplied by the light source module. It is assumed that the perimeter walls around the jail have numerous levels and are off-limits to any inmates. A 10 m gap separates the LDR positioned on one side of the wall from where the laser sensor is deployed at one end of the wall. The IOT platform will alert the jail guards if someone breaks through this wall to flee.

V.CONCLUSION

Basically the conclusion of the project is that if this system is implemented in our prison system it would add a new level to the security rules of our country, by which monitoring of the system will be ease. This system will bring major difference in the number of jail breaks happening per year, which are not in record. This iot based system explains the varied systems available for prison safety and security which constitutes of a RF Transmitter and Microcontroller. Transmitter and receiver helps us to reduce the time taken by the system to get and take data. From distance too it will be easy to monitor , all time monitor is not necessary. This will make a safe environment for common people, also a relaxed way to duty by authorities to know the information about prisoners.

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